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10/849,349	05/18/2004	Motomi Matsunaga	1232-5416	6734

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EXAMINER

CHAPEL, DEREK S

ART UNIT PAPER NUMBER

2872

DATE MAILED: 10/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/849,349	Applicant(s) MATSUNAGA, MOTOMI	
	Examiner Derek S. Chapel	Art Unit 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. <u>09212006</u> . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Status Of Claims

1. This Office Action is in response to an amendment received 8/1/2006 in which Applicant lists claim 6 as being cancelled, claims 3-5 and 8 as being previously original, claims 1-2 and 7 as being amended, and claims 9-14 as being new. It is interpreted by the examiner that claims 1-5 and 7-14 are pending.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 5/19/2003. The return postcard receipt, received 8/2/2006, verifying that a copy of the foreign priority document, JP 2003-140352, was received by the USPTO with the original application filed 5/18/04 is acknowledged. However, the copy of the foreign priority document cannot be located by the patent office. Therefore, the foreign priority date is not granted but will be granted if another copy of Japanese foreign priority document JP 2003-140352 is resubmitted to the USPTO.

Specification

3. Amendments to the abstract received on 8/1/2006 are acknowledged and accepted. The previous objections to the abstract are withdrawn.

Claim Objections

4. Amendments to claims 2 and 7 and the cancellation of claim 6, received on 8/1/2006 are acknowledged and accepted. The previous objections to claims 2, 6 and 7 are withdrawn.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 3, 5, 7-9, 11 and 13-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeyama, U.S. Patent Publication 2002/0039232, of record (hereafter Takeyama).

7. As to claim 1, Takeyama teaches an optical system which guides a displaying luminous flux from a display device to an eye of an observer, comprising:

a first optical element (see figure 14, element P1) and a second optical element (see figure 14, element P2) in order from the side of an exit pupil of the optical system to the side of the display device (see figure 14, element 36, and col. 23, lines 1-12),

wherein a combined optical power provided by an emergent surface of the second optical element (see figure 14, element 41) and an incident surface of the first optical element (see figure 14, element 35) is a negative optical power (it is noted by the examiner that the emergent surface of the second optical element and the incident surface of the first optical element appear to have a negative power because of the similarity between the shape of the space of Takeyama to the shape of the space shown in figure 1 of the applicant's drawings), and the optical system forms an intermediate image with the displaying luminous flux in the first optical element (see figure 14, element P1); and

wherein the first optical element includes at least a first surface which has a reflecting action (see figure 14, element 33/34) and a second surface which reflects the displaying luminous flux reflected by the first surface back toward the first surface (see figure 14, element 32) such that a central principal ray of the displaying luminous flux incident again on the first surface is reflected and travels toward a substantially opposite side to a reflecting side in the previous reflection with respect to a normal to the first surface at a hit point of the central principal ray (see figure 14, element 34, it is noted by the examiner that this limitation appears to be met by the optical system disclosed in figure 14 of Takeyama, wherein the optical structure and system of the applicant's recited system and the optical elements and system of figure 14 of Takeyama are similar to each other).

8. As to claim 3, Takeyama teaches the combination of claim 1, wherein the optical system forms a pupil image in an optical path of the displaying luminous flux in the first optical element (see figure 14, element P1).

9. As to claim 5, Takeyama teaches the combination of claim 1, wherein at least one of the first and second optical elements includes a reflective surface decentered with respect to an optical path of the displaying luminous flux (see figure 14, elements 33, 32, 34 and 42).

10. As to claim 7, Takeyama teaches the combination of claim 1, wherein the first optical element reflects the displaying luminous flux a plurality of times by a reflective surface which is decentered with respect to an optical path of the displaying luminous flux (see figure 14, elements P1, 33, and 34),

and the optical system includes a case where an inner product which is formed between outer products each formed by a vector indicating incident light and a vector indicating reflected light in the respective reflections at the reflective surface is negative (it is noted by the examiner that this limitation appears to be met by the optical system disclosed in figure 14 of Takeyama, wherein the optical structure and system of the applicant's recited system and the optical elements and system of figure 14 of Takeyama are similar to each other).

11. As to claim 8, Takeyama teaches a display device (see figure 14, element 36, and col. 23, Lines 1-12) which forms an original image (see figure 14, element 36); and the optical system according to claim 1 (see section 7 of this office action).

12. As to claim 9, Takeyama teaches an optical system which guides a displaying luminous flux from a display device to an eye of an observer, comprising:

a first optical element (see figure 14, element P1) and a second optical element (see figure 14, element P2) in order from the side of an exit pupil of the optical system to the side of the display device (see figure 14, element 36, and col. 23, lines 1-12),

wherein a combined optical power provided by an emergent surface of the second optical element (see figure 14, element 41) and an incident surface of the first optical element (see figure 14, element 35) is a negative optical power (it is noted by the examiner that the emergent surface of the second optical element and the incident surface of the first optical element appear to have a negative power because of the similarity between the shape of the space of Takeyama to the shape of the space shown in figure 1 of the applicant's drawings), and the optical system forms an intermediate image with the displaying luminous flux in the first optical element (see figure 14, element P1);

wherein the first optical element reflects the displaying luminous flux a plurality of times by a reflective surface which is decentered with respect to an optical path of the displaying luminous flux (see figure 14, elements P1, 33, and 34); and

wherein the optical system includes a case where an inner product which is formed between outer products each formed by a vector indicating incident light and a vector indicating reflected light in the respective reflections at the reflective surface is negative (it is noted by the examiner that this limitation appears to be met by the optical system disclosed in figure 14 of Takeyama, wherein the optical structure and system of

the applicant's recited system and the optical elements and system of figure 14 of Takeyama are similar to each other).

13. As to claim 11, Takeyama teaches the combination of claim 9, wherein the optical system forms a pupil image in an optical path of the displaying luminous flux in the first optical element (see figure 14, element P1).

14. As to claim 13, Takeyama teaches the combination of claim 9, wherein at least one of the first and second optical elements includes a reflective surface decentered with respect to an optical path of the displaying luminous flux (see figure 14, elements 33, 32, 34 and 42).

15. As to claim 14, Takeyama teaches an image display apparatus comprising: a display device (see figure 14, element 36, and col. 23, Lines 1-12) which forms an original image (see figure 14, element 36); and the optical system according to claim 9 (see section 12 of this office action).

16. Claims 1, 3-5, 7-9 and 11-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Takagi et al, U.S. Patent Number 7,012,756 B2 (hereafter Takagi).

17. As to claim 1, Takagi teaches an optical system which guides a displaying luminous flux from a display device to an eye of an observer, comprising:

a first optical element (see figure 17, element 31) and a second optical element (see figure 17, element 21) in order from the side of an exit pupil of the optical system to the side of the display device (see figure 17, elements S1 and SI, and col. 24, lines 17-24),

wherein a combined optical power provided by an emergent surface of the second optical element (see figure 17, element S8) and an incident surface of the first optical element (see figure 17, element S3/S7) is a negative optical power (see Equation 1 provided by the examiner below), and the optical system forms an intermediate image with the displaying luminous flux in the first optical element (see figure 17, the top of element 31); and

wherein the first optical element includes at least a first surface which has a reflecting action (see figure 17, element S2/S4/S6) and a second surface which reflects the displaying luminous flux reflected by the first surface back toward the first surface (see figure 17, element S5) such that a central principal ray of the displaying luminous flux incident again on the first surface is reflected and travels toward a substantially opposite side to a reflecting side in the previous reflection with respect to a normal to the first surface at a hit point of the central principal ray (see figure 17, element S2/S4/S6, it is noted by the examiner that this limitation appears to be met by the optical system disclosed in figure 17 of Takagi, wherein the optical structure and system of the applicant's recited system and the optical elements and system of figure 17 of Takagi are similar to each other).

Equation 1:

$$\begin{aligned} 1/f &= ((n_2 - n_1)/n_1) * ((1/R_1) - (1/R_2)) \\ 1/f &= -((1/15.9216) - (1/-67.1042)) = -.047906 \\ &\text{*Values gotten from table 1 in column 25 of} \\ &\text{Takagi} \end{aligned}$$

18. As to claim 3, Takagi teaches the combination of claim 1, wherein the optical system forms a pupil image in an optical path of the displaying luminous flux in the first optical element (see figure 17, the top of element 31).

19. As to claim 4, Takagi teaches the combination of claim 1, wherein the optical system forms a pupil image in an optical path of the displaying luminous flux in the second optical element (see figure 17, element 21).

20. As to claim 5, Takagi teaches the combination of claim 1, wherein at least one of the first and second optical elements includes a reflective surface decentered with respect to an optical path of the displaying luminous flux (see figure 17, elements 21 and 31).

21. As to claim 7, Takagi teaches the combination of claim 1, wherein the first optical element reflects the displaying luminous flux a plurality of times by a reflective surface which is decentered with respect to an optical path of the displaying luminous flux (see figure 17, elements 21 and 31),

and the optical system includes a case where an inner product which is formed between outer products each formed by a vector indicating incident light and a vector indicating reflected light in the respective reflections at the reflective surface is negative (it is noted by the examiner that this limitation appears to be met by the optical system disclosed in figure 17 of Takagi, wherein the optical structure and system of the applicant's recited system and the optical elements and system of figure 17 of Takagi are similar to each other).

22. As to claim 8, Takagi teaches a display device (see figure 17, element SI) which forms an original image (see figure 17, element SI); and the optical system according to claim 1 (see section 17 of this office action).

23. As to claim 9, Takagi teaches an optical system which guides a displaying luminous flux from a display device to an eye of an observer, comprising:

a first optical element (see figure 17, element 31) and a second optical element (see figure 17, element 21) in order from the side of an exit pupil of the optical system to the side of the display device (see figure 17, elements S1 and SI, and col. 24, lines 17-24),

wherein a combined optical power provided by an emergent surface of the second optical element (see figure 17, element 31) and an incident surface of the first optical element (see figure 17, element S3/S7) is a negative optical power (see Equation 1 provided by the examiner above), and the optical system forms an intermediate image with the displaying luminous flux in the first optical element (see figure 17, the top of element 31);

wherein the first optical element reflects the displaying luminous flux a plurality of times by a reflective surface which is decentered with respect to an optical path of the displaying luminous flux (see figure 17, element 31); and

wherein the optical system includes a case where an inner product which is formed between outer products each formed by a vector indicating incident light and a vector indicating reflected light in the respective reflections at the reflective surface is negative (it is noted by the examiner that this limitation appears to be met by the optical

system disclosed in figure 17 of Takagi, wherein the optical structure and system of the applicant's recited system and the optical elements and system of figure 17 of Takagi are similar to each other).

24. As to claim 11, Takagi teaches the combination of claim 9, wherein the optical system forms a pupil image in an optical path of the displaying luminous flux in the first optical element (see figure 17, the top of element 31).

25. As to claim 12, Takagi teaches the combination of claim 9, wherein the optical system forms a pupil image in an optical path of the displaying luminous flux in the second optical element (see figure 17, element 21).

26. As to claim 13, Takagi teaches the combination of claim 9, wherein at least one of the first and second optical elements includes a reflective surface decentered with respect to an optical path of the displaying luminous flux (see figure 17, elements 21 and 31).

27. As to claim 14, Takagi teaches a display device (see figure 17, element SI) which forms an original image (see figure 17, element SI); and the optical system according to claim 9 (see section 23 of this office action).

Claim Rejections - 35 USC § 103

28. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

29. Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeyama, U.S. Patent Publication 2002/0039232, of record (hereafter Takeyama) in view of Imamura et al., U.S. Publication No. 2002/0180907, of record (hereafter Imamura).

30. As to claims 2 and 10, Takeyama discloses the combination of claims 1 and 9, having a display device (see figure 14, element 36).

Takeyama does not teach that the display device is a reflective display device or that the optical system further comprises a third optical element between the reflective display device and the second optical element.

However, Imamura discloses a reflective display device (see figure 1) that further comprises a polarizing plate on the reflective display device (see figure 1, element 19).

Therefore, it would have been obvious to someone of ordinary skill in the art at the time the invention was made replace the display device of Takeyama with a reflective display device of Imamura and to put a polarizing plate in front of the reflective display device, as taught by Imamura, and therefore between the reflective display device and the second optical element of Takeyama for the purpose of only allowing desirable polarizations of light to reflect off the LCD and for glare reduction and brightness enhancement.

31. Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al, U.S. Patent Number 7,012,756 B2 (hereafter Takagi) in view of Imamura et al., U.S. Publication No. 2002/0180907, of record (hereafter Imamura).

32. As to claims 2 and 10, Takagi discloses the combination of claims 1 and 9, having a display device (see figure 24, element SI).

Takagi does not teach that the display device is a reflective display device or that the optical system further comprises a third optical element between the reflective display device and the second optical element.

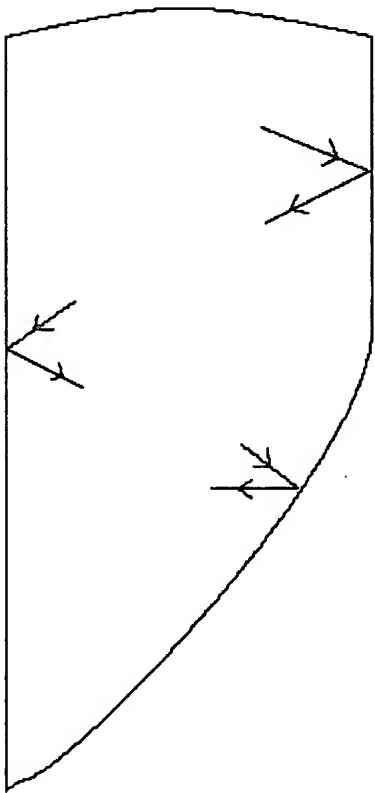
However, Imamura discloses a reflective display device (see figure 1) that further comprises a polarizing plate on the reflective display device (see figure 1, element 19). Therefore, it would have been obvious to someone of ordinary skill in the art at the time the invention was made replace the display device of Takagi with a reflective display device of Imamura and to put a polarizing plate in front of the reflective display device, as taught by Imamura, and therefore between the reflective display device and the second optical element of Takagi for the purpose of only allowing desirable polarizations of light to reflect off the LCD and for glare reduction and brightness enhancement.

Response to Arguments

32. Applicant's arguments filed 8/1/2006 have been fully considered but they are not persuasive. The examiner agrees that Togino et al., U.S. Patent No. 6,222,676, (hereafter Togino) does not teach all of the limitations of amended claim 1. However, the examiner believes the second and third surfaces of the first element (see figure 14,

elements 33 and 34) of Takeyama, U.S. Patent Publication 2002/0039232 (hereafter Takeyama) are the same, just as the second and third surfaces (see figure 1, elements S3 and S5) of the applicant's pending application are the same. Further, Takeyama seems to reflect light in the first optical member just as in the first optical member of the applicant's pending application. See Drawing 1 below which has been provided by the examiner.

Drawing 1:



Finally, it is argued that the inner product which is formed between outer products each formed by a vector indication incident light and a vector indicating reflected light in the respective reflection is positive in Takeyama. However, no

evidentiary support is given to shown how this is calculated to be positive and not negative. Therefore, the examiner still believes that this value is negative due to the similar shape and functions of the optical system of Takeyama and the optical system of the applicant.

Conclusion


34. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

35. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek S. Chapel whose telephone number is 571-272-8042. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A. Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


DSC
9/27/2006


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